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1 Claims

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3 1. A transparent assembly locatable in a window  
4 frame having a rebate, the assembly having a  
5 transparent panel and one or more high tensile  
6 strength flexible material reinforcement pieces  
7 extending laterally from the panel to provide  
8 non-rigid attachment of the assembly to a  
9 subframe and/or wall, wherein the attachment  
10 allows movement of the assembly within the  
11 rebate.

12

13 2. An assembly as claimed in Claim 1 wherein the  
14 or each reinforcement piece is woven fabric  
15 material, woven glass fibre material, polyester  
16 fibre material or metal, or a combination  
17 thereof.

18

19 3. An assembly as claimed in Claim 1 or Claim 2  
20 wherein the reinforcement piece(s) laterally  
21 extend around the periphery of the panel.

22

23 4. An assembly as claimed in Claim 3 wherein the  
24 reinforcement piece(s) laterally extend wholly  
25 or substantially along the periphery of the  
26 panel.

27

28 5. An assembly as claimed in any one of the  
29 preceding Claims wherein the reinforcement  
30 pieces are in the form of a series of discrete  
31 straps.

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- 1     6.    An assembly as claimed in Claim 5 wherein the  
2           reinforcement pieces are webbing.  
3
- 4     7.    An assembly as claimed in any one of the  
5           preceding Claims wherein the transparent panel  
6           comprises at least one glass layer and at least  
7           one resin layer to form a lamination, and  
8           wherein the or each reinforcement piece extends  
9           from a resin layer.  
10
- 11    8.    An assembly as claimed in Claim 7 wherein the  
12           assembly has a glass/resin/glass lamination.  
13
- 14    9.    An assembly as claimed in Claim 7 or 8 wherein  
15           the or each resin is layer formed from  
16           polyurethane clear cast resin.  
17
- 18    10.   An assembly as claimed in Claim 9 wherein the  
19           resin is Naftolan.  
20
- 21    11.   An assembly as claimed in any one of Claims 7  
22           to 10 wherein the or each resin layer includes  
23           directional fibre reinforcement at or near each  
24           edge of the or each resin layer, and wherein  
25           the or each reinforcement piece extends around  
26           the fibre reinforcement.  
27
- 28    12.   An assembly as claimed in Claim 11 wherein the  
29           fibre reinforcements are unidirectional glass  
30           fibres, whose direction follows the edge  
31           direction of the resin layer.  
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- 1 13. An assembly as claimed in Claim 11 or Claim 12  
2 wherein the fibre reinforcements are cast in  
3 the resin layer simultaneously with casting of  
4 the resin.  
5
- 6 14. An assembly as claimed in any one of Claims 1  
7 to 6 wherein the transparent panel comprises  
8 one or more polycarbonate and/or PET layers.  
9
- 10 15. An assembly as claimed in Claim 14 wherein the  
11 panel includes one or more glass layers  
12 laminated with the or each polycarbonate and/or  
13 PET layer.  
14
- 15 16. An assembly as claimed in Claim 14 or Claim 15  
16 wherein the assembly has a plurality of  
17 reinforcement pieces, and the panel has a  
18 series of apertures at or near its periphery  
19 through which the reinforcement pieces pass.  
20
- 21 17. An assembly as claimed in any one of the  
22 preceding Claims wherein the non-rigid  
23 attachment is provided by the or each  
24 reinforcement piece being stretchable.  
25
- 26 18. An assembly as claimed in any one of the  
27 preceding Claims wherein the non-rigid  
28 attachment is provided by the or each re-  
29 inforcement piece being slack between the  
30 lamination and the subframe and/or wall.  
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1 19. An assembly as claimed in any one of the  
2 preceding Claims wherein the assembly is a  
3 window.  
4

5 20. An assembly as claimed in any one of the  
6 preceding Claims wherein any shock loading on  
7 the assembly is wholly or substantially not  
8 passed to or through the rebate.  
9

10 21. A blast-resistant composite material comprising  
11 at least one layer of polyurethane clear cast  
12 resin having at least one reinforcement piece  
13 extending wholly or substantially across the  
14 resin layer.  
15

16 22. A material as claimed in Claim 21 wherein the  
17 or each reinforcement piece is a strip or bar.  
18

19 23. A material as claimed in Claim 21 or Claim 22  
20 wherein the material has a series of  
21 reinforcement pieces forming a grid-like  
22 structure wholly or substantially across the  
23 composite material.  
24

25 24. A material as claimed in any one of Claims 21  
26 to 23 wherein the or each reinforcement piece  
27 is one or more of woven roving, webbing,  
28 webbing material or metal.  
29

30 25. A material as claimed in any one of Claims 21 to  
31 24 wherein the material is a one piece  
32 assembly.

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- 1
- 2 26. A wall-reinforcement assembly for a wall having
- 3 an adjacent floor and ceiling, comprising a
- 4 first wall-adjacent layer formed wholly or
- 5 substantially of fibre reinforced composite
- 6 flexible material, and a second layer
- 7 comprising one or more high tensile strength
- 8 flexible material reinforcement pieces, wherein
- 9 at least one of said reinforcement pieces is
- 10 secured to the floor and/or the ceiling.
- 11
- 12 27. An assembly as claimed in Claim 26 wherein the
- 13 reinforcement pieces are secured to a strong
- 14 floor and/or strong part of the ceiling.
- 15
- 16 28. An assembly as claimed in Claim 26 or Claim 27
- 17 wherein the first composite layer is a sheet of
- 18 glass fibre reinforced plastic or Kevlar
- 19 material, either loose or in resin, which is
- 20 able to extend across the area of the wall to
- 21 be reinforced.
- 22
- 23 29. An assembly as claimed in any one of Claims 26
- 24 to 28 wherein the pieces of the second layer
- 25 comprise a series of parallel straps.
- 26
- 27 30. An assembly as claimed in any one of Claims 26
- 28 to 29 wherein the assembly includes a third
- 29 layer adapted to provide an internal finished
- 30 layer.
- 31

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1 31. An impact-resistant system comprising the  
2 conjunction or combination of an assembly as  
3 claimed in any one of Claims 1 to 20 and an  
4 assembly as claimed in any one of Claims 26 to  
5 30.

6  
7 32. A system as claimed in Claim 31 wherein the  
8 laminated transparent assembly is in a form of  
9 a window, and wherein the flexible material  
10 reinforcement pieces of the wall-reinforcement  
11 assembly combine with the flexible material  
12 reinforcement pieces of the window assembly.

13  
14 33. A system as claimed in Claim 31 wherein the  
15 material reinforcement pieces of a wall  
16 reinforcement assembly extend internally  
17 through the laminated transparent assembly,  
18 such that the reinforcement pieces are secured  
19 by the cast resin in the window, and are of  
20 sufficient length to enable the pieces to be  
21 secured at fixing points at the top and bottom  
22 of a wall being reinforced by the assembly.

23  
24 34. A system as claimed in any one of Claims 31 to  
25 33 wherein the transparent assembly is located  
26 in a frame, and one end of the reinforcement  
27 pieces of the wall-reinforcement assembly are  
28 secured to the frame.

29  
30 35. An optically transparent composite material  
31 comprising at least one glass/resin/glass layer  
32 lamination, wherein the resin is a polyurethane

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1 clear cast resin having optical fibre-  
2 reinforcement therein.

3

4 36. A material as claimed in Claim 35 wherein the  
5 fibre reinforcement in the resin layer is in  
6 the form of filaments of in the form of  
7 particles such as beads.

8

9 37. A material as claimed in Claim 35 or Claim 36  
10 for use as or in a window.

11

12 38. A material as claimed in any one of Claims 35  
13 to 37 to provide a laminated optically  
14 transparent assembly comprising at least one  
15 glass/resin/glass layer lamination, and having  
16 one or more high tensile strength flexible  
17 material reinforcement pieces extending  
18 laterally from the resin to provide attachment  
19 of the assembly to a surround.

20

21 39. An assembly or a material as claimed in any one  
22 of Claims 1 to 20 and 35 to 38 wherein at least  
23 one of any glass layer is toughened glass.

24

25 40. A transparent assembly having a transparent  
26 panel and one or more high tensile strength  
27 flexible material reinforcement pieces  
28 extending laterally from the panel to provide  
29 non-rigid attachment of the assembly to a  
30 subframe and/or wall, in conjunction with a  
31 wall-reinforcement assembly as claimed in any  
32 one of Claims 26 to 30, wherein the assembly is

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- 1       secured to the reinforcement pieces of the
- 2       wall-reinforcement assembly.